

SUNDANCE
OPERATION AND MAINTENANCE
MANUAL

CINEMATRONICS, INC.
1466 PIONEER WAY
EL CAJON, CA. 92020

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WARRANTY

Cinematronics, Inc. warrants the goods to be free from defects in material and workmanship under normal use and service for a period of ninety (90) days from the date of delivery on all parts except switches, buttons, lights and fuses, for which the warranty period is thirty (30) days from the date of delivery. Cinematronics makes no representations or warranties concerning the goods whether express or implied by operation of law or otherwise, including those of merchantability or fitness for any particular purpose, or with respect of patent infringement, except as may be specifically made herein. Cinematronics limits its warranty obligations herein to the repair or replacement of such parts which have been returned to Cinematronics' plant at purchaser's expense and which examination shall disclose to Cinematronics' satisfaction to have been so defective and to the shipment of such repaired or replacement parts to the purchaser F.O.B. the shipping point.

This warranty does not apply to any Cinematronics product which has been altered or repaired by unauthorized personnel or service facilities or any products which have had the unit serial number altered or removed.

Upon acceptance of the goods, the purchaser agrees to assume all liability for damages and/or bodily injury by the purchaser or any other person and to hold Cinematronics, Inc. harmless from liability or claims arising from the use of the goods by any person. Purchaser further agrees to indemnify Cinematronics, Inc. from any liability, claim, cause of action or litigation resulting from the use or misuse of the goods by any person.

Parts returned for warranty service must be packaged so that no damage is incurred during the shipment. Full documentation and instructions must accompany returned parts. Parts must be shipped prepaid to:

Cinematronics, Inc.
1466 Pioneer Way
El Cajon, Calif 92020

CUSTOMER SERVICE PROCEDURES

It is the desire of Cinematronics, Inc. to provide efficient and courteous service should the need arise. We have a fully staffed Customer Service Department and encourage you to call our toll free number: 800-854-6577, 78, for technical assistance between the hours of 7:00 A.M. and 5:00 P.M., California time, Monday through Friday.

In order to provide the very best service possible, the following procedures for ordering or returning parts must be followed:

1. All equipment ordered from Customer Service, whether in or out of Warranty, must be placed with a Distributor's purchase order, either by mail or verbally by telephone.

2. Advance replacement items may be obtained only during the term of the Warranty and when such items are available, using the same procedure as when ordering parts. When ordering a PCB, please include with your order the game serial number and the number of the PCB you wish replaced.

3. All items received as advance replacements will, after a period of thirty (30) days, become the property of the Distributor, with applicable charges applied in the event Customer Service has not received the defective item against which the advance replacement was made.

4. The Distributor must call this facility for an RMA number prior to returning any item. Please be prepared to provide us with the game serial number and the PCB number when requesting an RMA.

5. In all situations covered above, and in all other situations, the Warranty offered by Cinematronics, Inc is applicable and should be fully understood.

6. Parts returned for service must be packaged so that no damage is incurred during the shipment. Cartons without a prominently displayed RMA number will not be accepted. Full documentation including game serial number, PCB number and reason for the return must accompany parts. Ship prepaid to:

Cinematronics, Inc.
Customer Service Department
1466 Pioneer Way
El Cajon, CA 92020

800-854-6577

714-440-2933

SECTION I

INTRODUCTION

Sundance is a game for 1 or 2 players. The video display is capable of generating 16 levels of intensity, and the audio section will produce 6 different sounds during play. Player "1" has control of 9 "Hatch" buttons on the lower grid. Player "2" has similar control of the upper grid. One point is earned for each sun swallowed by a hatch or blasted by firing a "Nova". Periodically, a flashing sun appears, and 5 points are earned for a successful hit. In the event of any miss, the Nova must be swallowed by the hatch from which it was released before play can continue. Skill levels and optional play grid can be changed any time during play. Collecting 4 bonuses during a one

player game awards a minimum credit of 5 seconds additional play time. (A 20 second credit is awarded if the operator option switch is set for 2 minutes of play time). Coins can be added during a game for additional play time; play will continue automatically after a brief halt in display activity.

As an incentive to try out the game, a separately programmed "attract mode" continuously displays the game's visual effects in brief, inviting form. Audio is not present during the attract mode. The game is ready to play when - for a one player game - a coin is inserted and the one player select button is depressed.

SECTION 2
INSTALLATION

SECTION 2

INSTALLATION

RECEIVING INSPECTION

Your game was shipped in ready-to-play condition. However, after removal of the shipping carton, a brief visual examination) is suggested.

Naturally, you'll want to make note of any physical damage to the game cabinet and its external components for freight claim purposes. Considering the quality of the shipping carton, any damage to the exterior would indicate possible interior damage as well.

The "guts" of the game should also undergo a brief examination for: loose mounting hardware (check to be sure that the major components are still securely mounted); disconnected or loose wires, cables or harnesses; electronic devices loose in their sockets; etc.

At this time the game serial number should be logged. Please remember that the game serial number will be required if you need service from your distributor.

ELECTRICAL REQUIREMENTS

Unless specified otherwise, your game was shipped to operate at 115 VAC, 50/60 Hz. Two other voltage settings are possible. The power supply chassis has a table which shows the voltage options and fusing requirements.

A good earth ground is essential for the proper operation of this game or for that matter any electronic device. Problems with instability and erratic

operation of computer-type devices can usually be traced to an ineffective ground system.

INITIAL ADJUSTMENTS

NOTE

When the game is connected to AC power, one of the game sounds may be heard. This is normal.

The audio level (volume) can be easily adjusted and this is achieved by rotation of the only control on the audio circuit board. The audio level should compete with other machines "on the floor" to maximize play time.

Display brightness is another easy adjustment. The monitor assembly has several adjustments, but the brightness control is the only one which does not require a "screwdriver" for rotation. Keep the brightness at the correct level for appeal. The optimum brightness setting is at the point where the origin of the start burst is not visible. If set too high, many of the same intensity changes will not be apparent, and premature burning of the CRT phosphor may occur.

OPERATOR OPTIONS

The option switch is located on the logic or game board. It is not necessary to remove the board from the cabinet to set the options. In fact, the option switch and audio control can be reached easily through the coin door opening. Table 2-1 will assist you with your selections:

MAINTENANCE

TABLE 6-1. TROUBLESHOOTING GUIDE

PROBLEM

PROBABLE SOLUTIONS

No picture

Listen for audible "clatter" from the Vector circuitry on the display board. If the clatter is present, then the DAC's and the analog switch (LF1331) are operational and the problem is in the intensity circuitry.

If game audio is present, the problem is in the monitor. If the audio is distorted or absent, the problem is usually on the logic board. Check IC F-2 pins 4, 5, 6, 7, 9 & 12.

Check the neck of the CRT for a glowing filament. If there is no glow check the black and brown wires of the CRT connector for 6.3 VAC between them.

Check IC C-8 pin 6 on the CPU with a logic probe. Pin 6 should be low indicating that the CPU is not continuously resetting.

Be sure all connections are made to the display board and CPU.

Connect a scope to the yellow wire leading to the CRT connector. Set brightness full clockwise. There should be data pulses of 50 volts P-P at an 80-100 volt base. If no data pulses are present, connect a scope probe to pin 2 of IC U7 and check for data pulses. If data is present, check Q1 and Q2 with an ohmmeter or a transistor tester.

Check J2 pin 14 for +25 volts unfiltered.

Check CRT neck for broken pins or other damage.

Check the seating of the CRT plug and insure that proper connections are being made.

Narrow line on display

Check for an open winding in the yoke coils

Check for bad connections of yoke wires to display board.

Check for continuity between display board and power transistors on heat sinks Q110, Q111, Q210, and Q211.

Check for faulty power transistors Q110, Q111, Q210 and Q211. Also check for broken solder connections on circuit board molex connector socket pins.

Half of picture missing

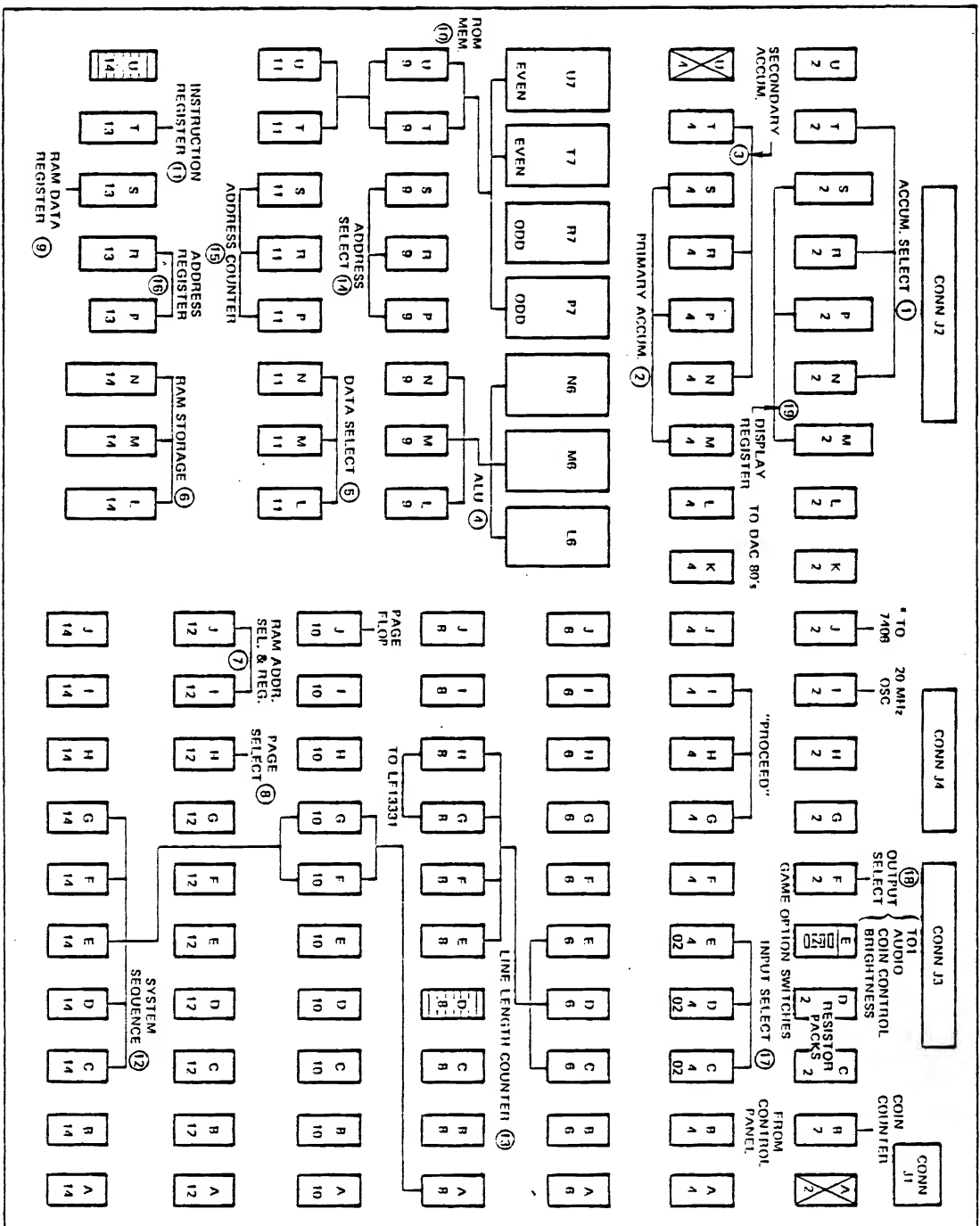
Left half: Check Q208, Q206, Q210
Right half: Check Q209, Q207, Q211
Top half: Check Q109, Q107, Q111
Bottom half: Q108, Q106, Q110

TABLE 6-1. TROUBLESHOOTING GUIDE (Continued)

PROBLEM	PROBABLE SOLUTIONS
No brightness control	<p>Check intensity pot R11 for open wiper or internal short.</p> <p>Check for open capacitor C17</p> <p>Check for bad solder connections to R11.</p>
Circuit Breakers Trip	<p>Disconnect power to display board. If circuit breakers continue to blow, check for a shorted speaker coil. Verify that the +15 and -15 volt regulators are operating properly. Verify that output power transistors on the audio board are good with an ohmmeter or a transistor tester.</p> <p>Check IC C-8 pin 6 on the CPU with a logic probe. Pin 6 should be low indicating that the CPU is not in continuous reset. Measure the voltage at IC T-13 pins 10 and 20 with an accurate voltmeter. Themeter should read between 4.8 and 5.1 volts DC for normal system operation.</p> <p>Remove connectors J3 and J4 on the display board and check power transistors Q110, Q111, Q210, and Q211 located on the heatsinks with an ohmmeter or transistor tester. Check diodes CR12 and CR15 located on the display circuit board.</p> <p>Disconnect the CRT yoke wires from the display board and remove CRT socket. Re-apply power to the display board and reset circuit breakers if necessary. If the breakers do not blow then check transistors Q208, Q209 and Q204 in the horizontal deflection circuit and transistors Q108, Q109, and Q104 in the vertical deflection circuit with an ohmmeter or transistor tester.</p> <p>Check the horizontal and vertical DACS for proper supply voltages at pins 13, 14, and 22.</p> <p>Measure outputs of amplifiers U102 and U202 with a scope for A \pm 2 volt P-P signal centered at zero volts.</p>
Picture on display jitters	<p>Check the vertical size adjustment R109 for wiper noise by turning the wiper briskly while observing the screen. Then re-adjust for proper screen size.</p> <p>Check for bad solder connections on R109.</p> <p>Repeat the above two steps for horizontal size adjustment R209.</p> <p>Check DAC U201 and U101 for bad solder connections.</p> <p>Check all molex connectors for good connections.</p> <p>Check analog switch U1 for faulty operation, loose connections to socket or poor solder connections.</p>

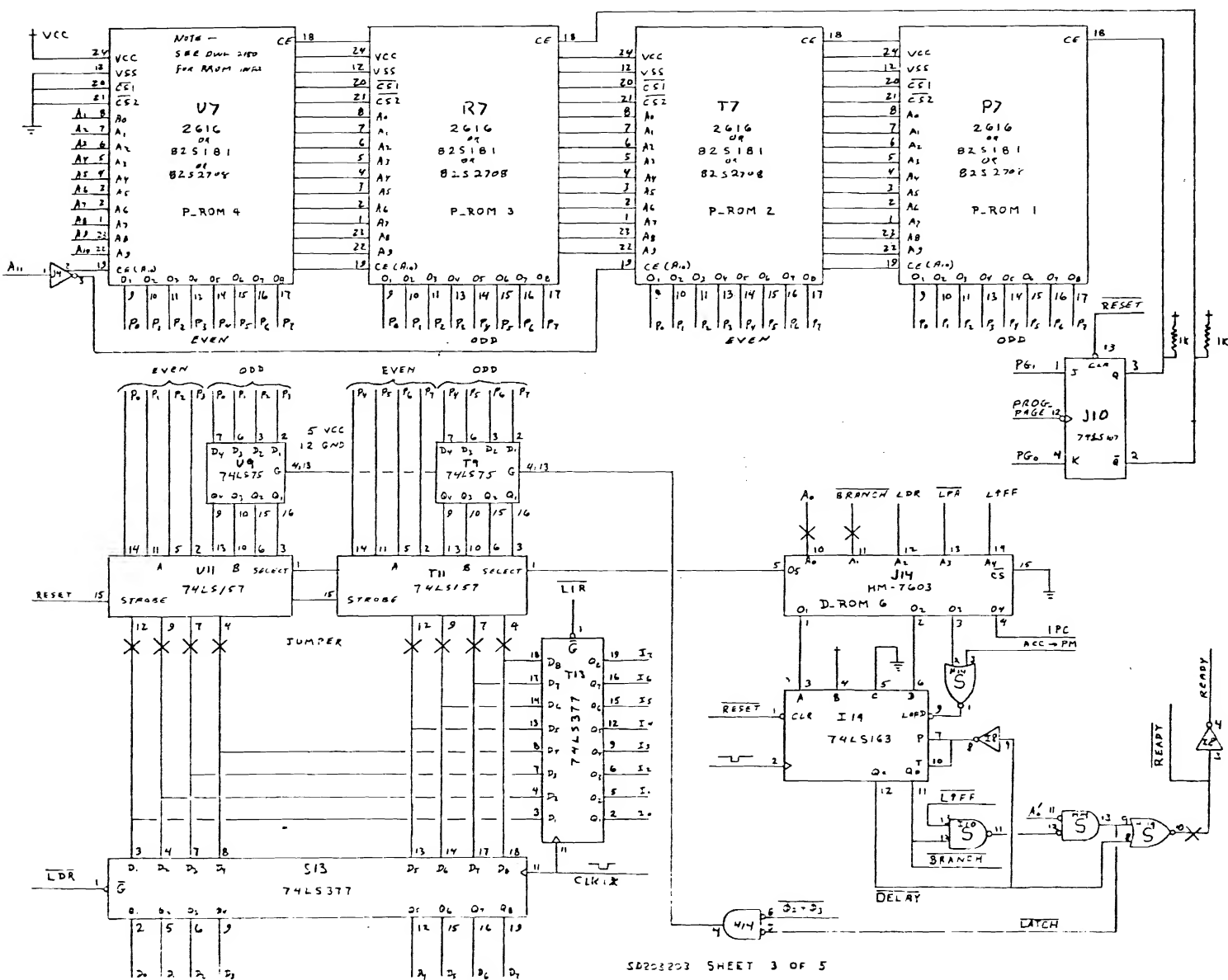
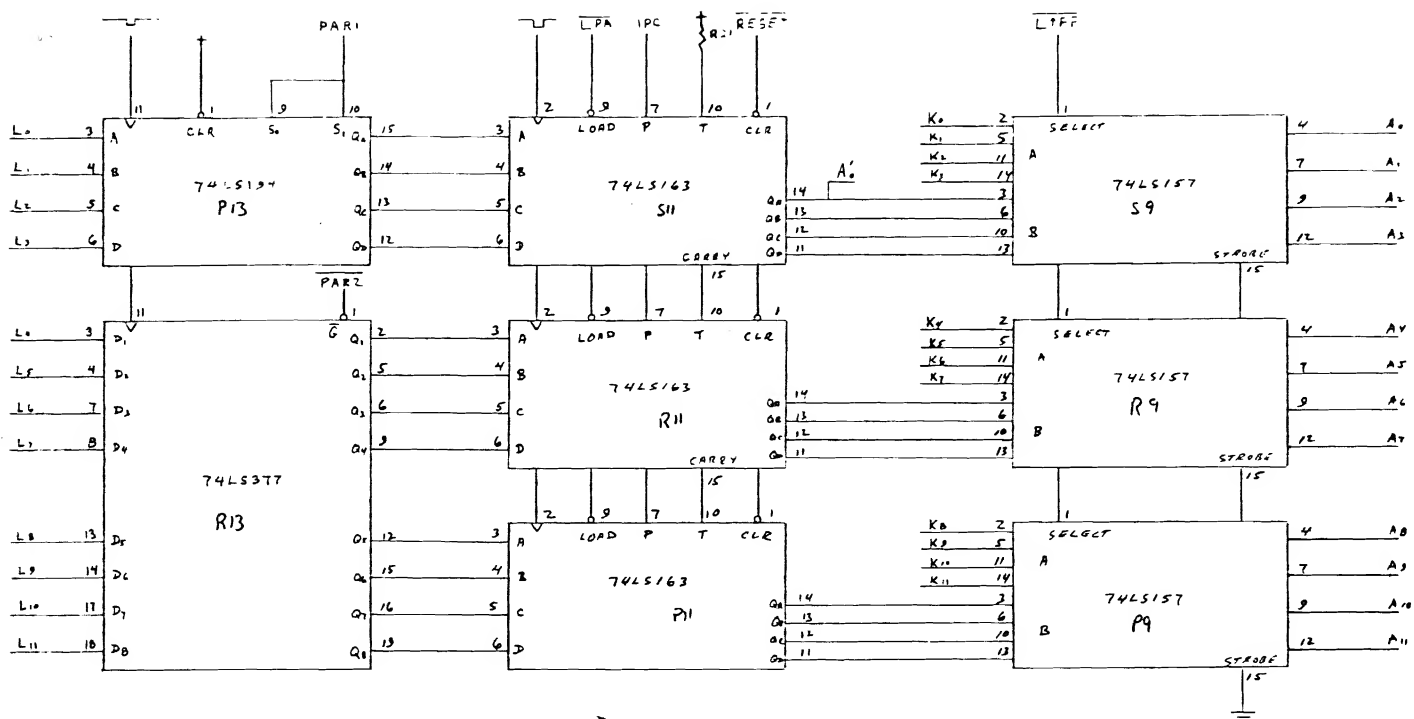
TABLE 6-1. TROUBLESHOOTING GUIDE (Continued)

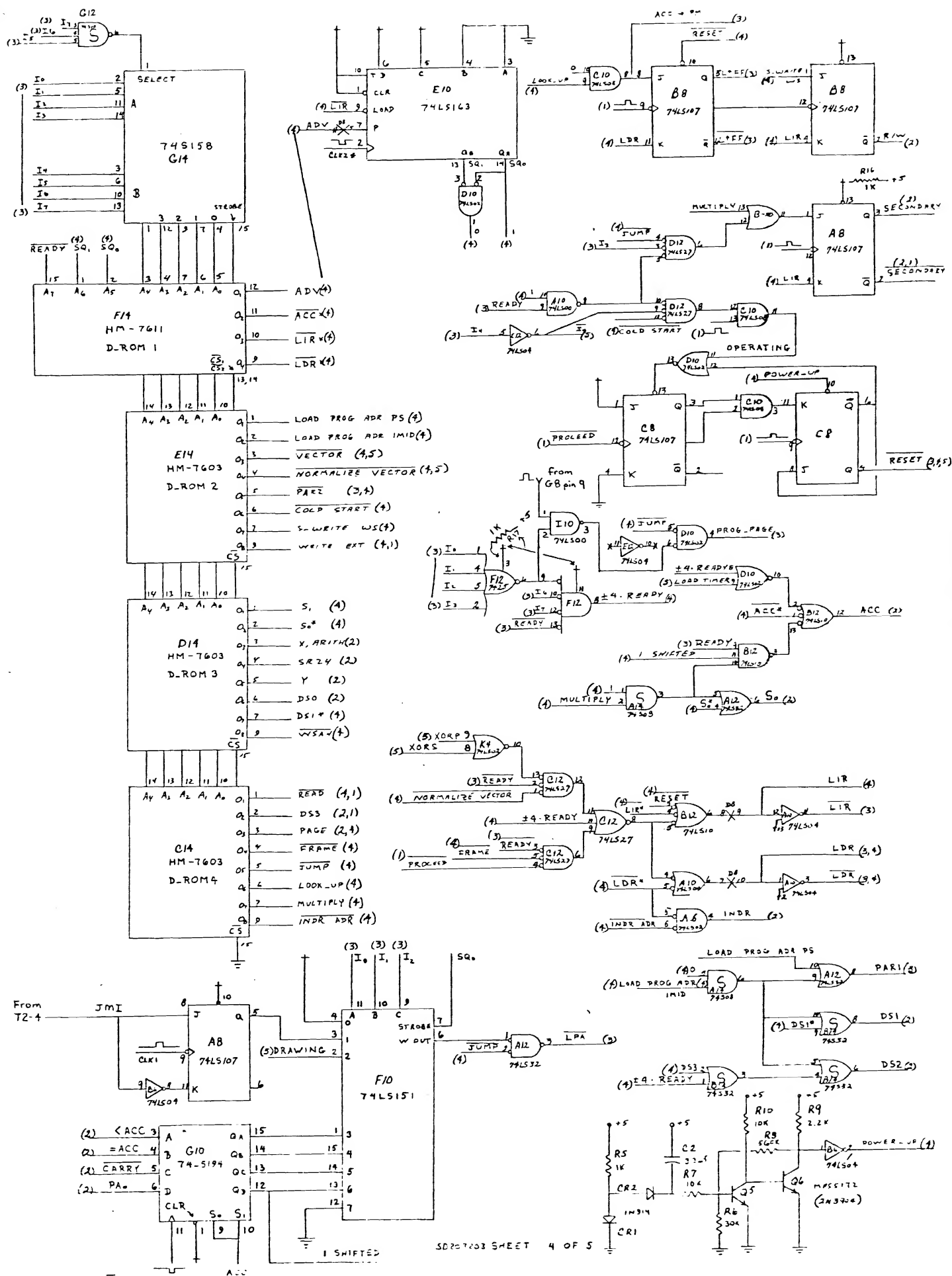
PROBLEM	PROBABLE SOLUTIONS
No high voltage	<p>On display board, check DC voltage output of IC U3. It should be +18 volts DC. If not present, check for +25 volts present at the input to U3.</p> <p>Check DC voltage output of IC U5. It should be -18 volts DC. If not present, check for -25 volts present at the input to U5.</p> <p>Lift the winding from pin 3 of the high voltage XFMR T1. Measure +18 volts. If the +18 volts is present, check for a shorted Q4, shorted capacitors C20, and C19, bad diodes CR7, and CR8.</p> <p>Check for 6 kilovolts at black wire of XFMR T1.</p>
Dotted display	<p>Check for faulty analog switch U1.</p> <p>Inspect yoke connections to display board.</p> <p>Check for open yoke windings.</p> <p>Check for proper +25 and -25 volts DC.</p> <p>Check operation of DACS U101 and U201.</p>
No audio sound	<p>Check for an open speaker coil</p> <p>Check transistors 2N6292 and 2N6107 and other nearby output components on audio board with an ohmmeter or transistor tester.</p> <p>Check for open wiper on volume control of audio board.</p> <p>Verify that CPU is fully operational.</p>
Coin counter is inoperative	<p>Check transistor 2N6292 on logic PCB with ohmmeter or transistor tester.</p> <p>Disconnect coin counter molex connector. Measure DC voltage on red wire. Meter should read +25 volts DC.</p> <p>Check power connector (J1) to logic board.</p> <p>Check electrical connection at pin 3 of J1.</p>

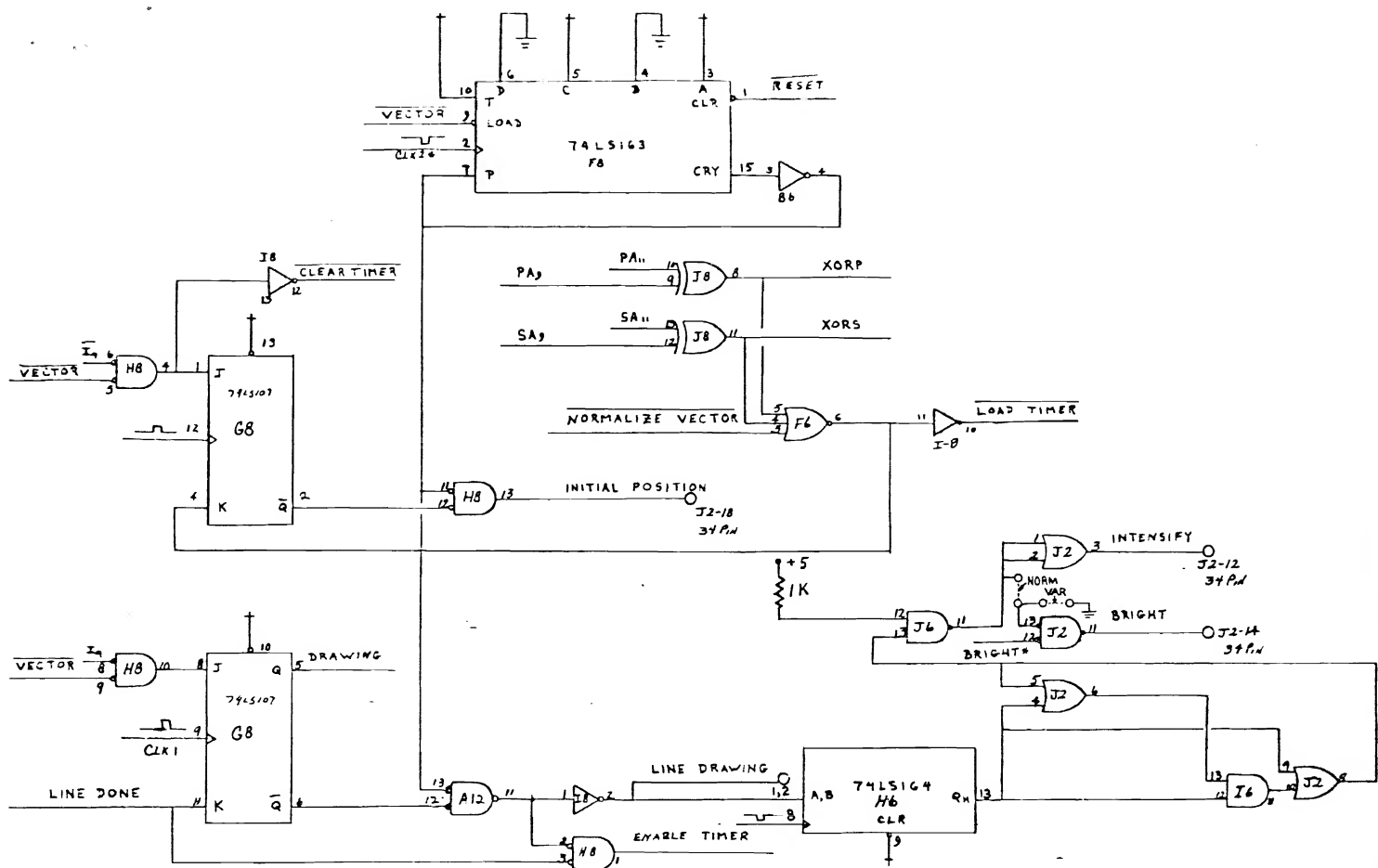


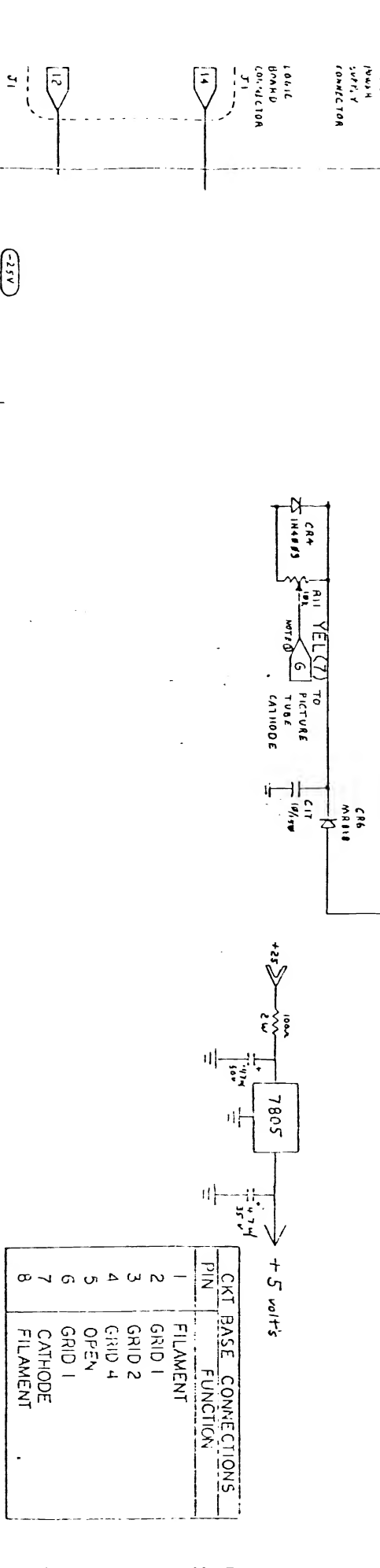
*ON 16-LEVEL INTENSITY CIRCUITRY

APPENDIX A
REFERENCE SCHEMATICS









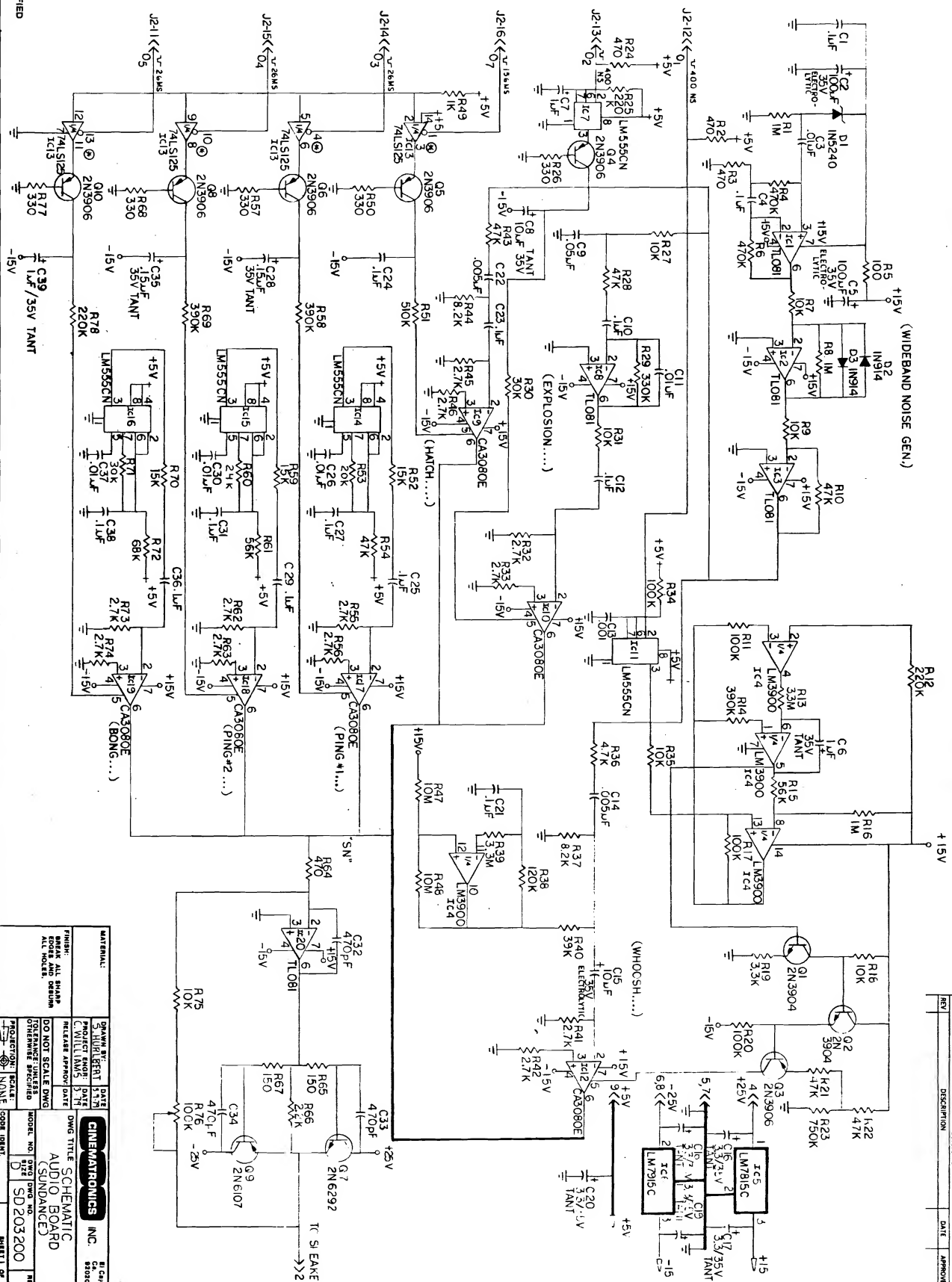
- ② THESE POWER TRANSISTORS ARE MOUNTED ON HEAT SINK:
AND ARE SEPARATE FROM THE P.C. BOARD (DWG. 110, 2114)
- ③ THESE ARE SOLDER CONNECTION POINTS ON THE P.C. BOARD

CCT BASE CONNECTIONS	
PIN	FUNCTION
1	FILAMENT
2	GRID 1
3	GRID 2
4	GRID 4
5	OPEN
6	GRID 1
7	CATHODE
8	FILAMENT

TITLE: DISPLAY ELECTRONICS
SCHEMATIC

SHEET 2 OF 2	DWG NO. 20710	AKC
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5. ADD .JLUF BYPASS CAP (150V) FROM GND. TO +5V FOR EACH TRN (2) I.C. PACKAGES
 - USING THE +5V SUPPLY LINE.
 4. ALL CAPS ARE CERAMIC DISK (50V) UNLESS OTHERWISE SPECIFIED
 3. ALL RESISTORS ARE 1/4 WATT, 5%,
 2. © DENOTES TRI-STATE TTL OUTPUT
 1. LAST REF DES. USED: C39, D3, R18, Q10.
- NOTES: UNLESS OTHERWISE SPECIFIED

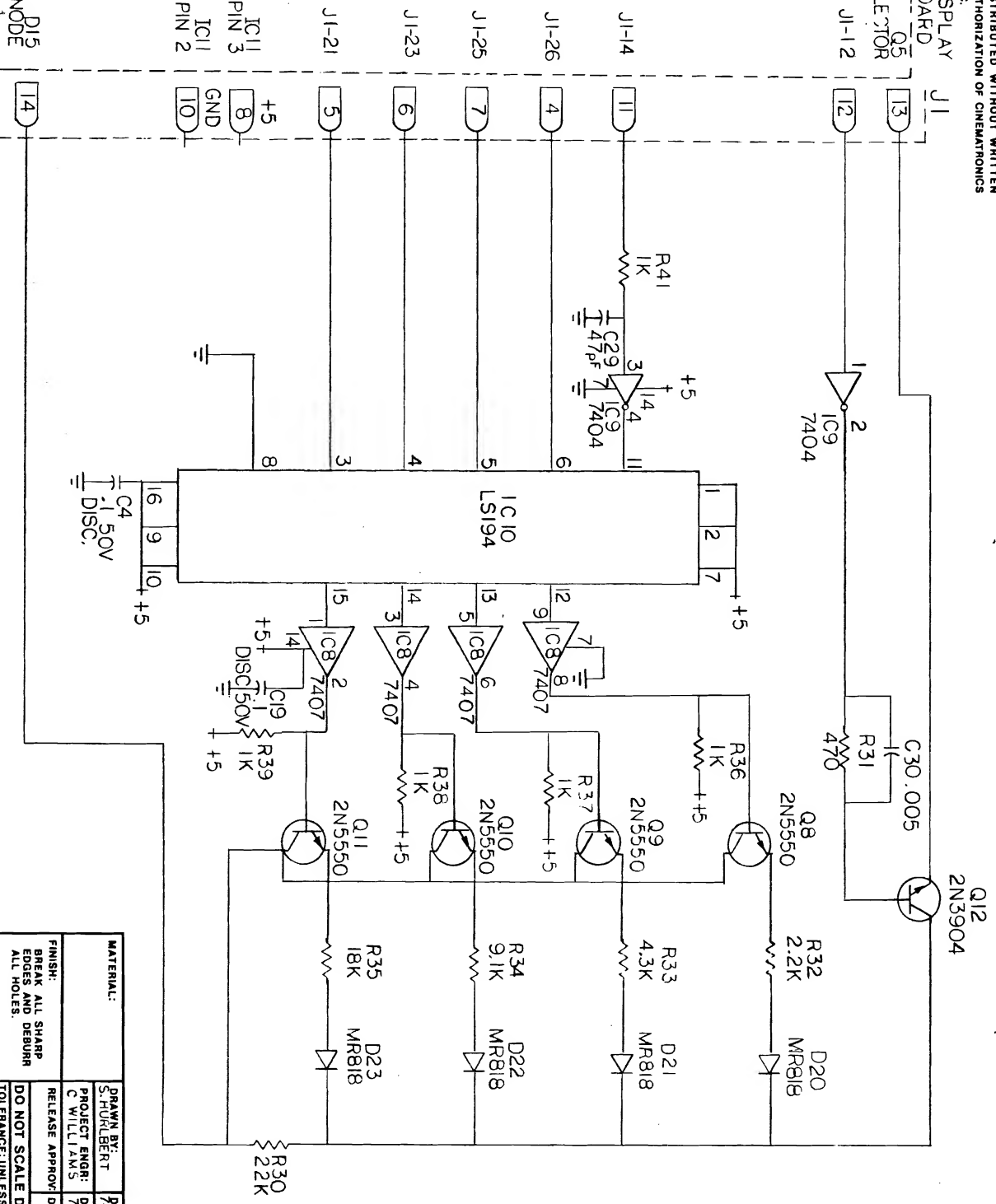
NOTES: UNLESS OTHERWISE SPECIFIED

[illegible]

MATERIAL:		DRAWN BY: <u>DMG</u>		DWG TITLE: <u>CINEMATRON</u>	
FINISH: <u>BREAK ALL SHARP ALL HOLES ALL SURF</u>		S. HOLDER: <u>DMG</u>		DWG NO: <u>1</u>	
RELEASE APPROV: <u>DATE</u>		C. WILLIAMS		SIZE: <u>1/2</u>	
DO NOT SCALE DWG		CHECKED BY: <u>DMG</u>		SHEET: <u>1</u>	
PROJECTION: <u>1st</u>		SCALE: <u>1/2</u>		CODE IDENT: <u>1</u>	
MODEL NO: <u>1</u>		DATE: <u>1/2</u>		SHEET: <u>1</u>	

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DISPLAY
BOARD
COLLECTOR



NOTES: UNLESS OTHERWISE SPECIFIED

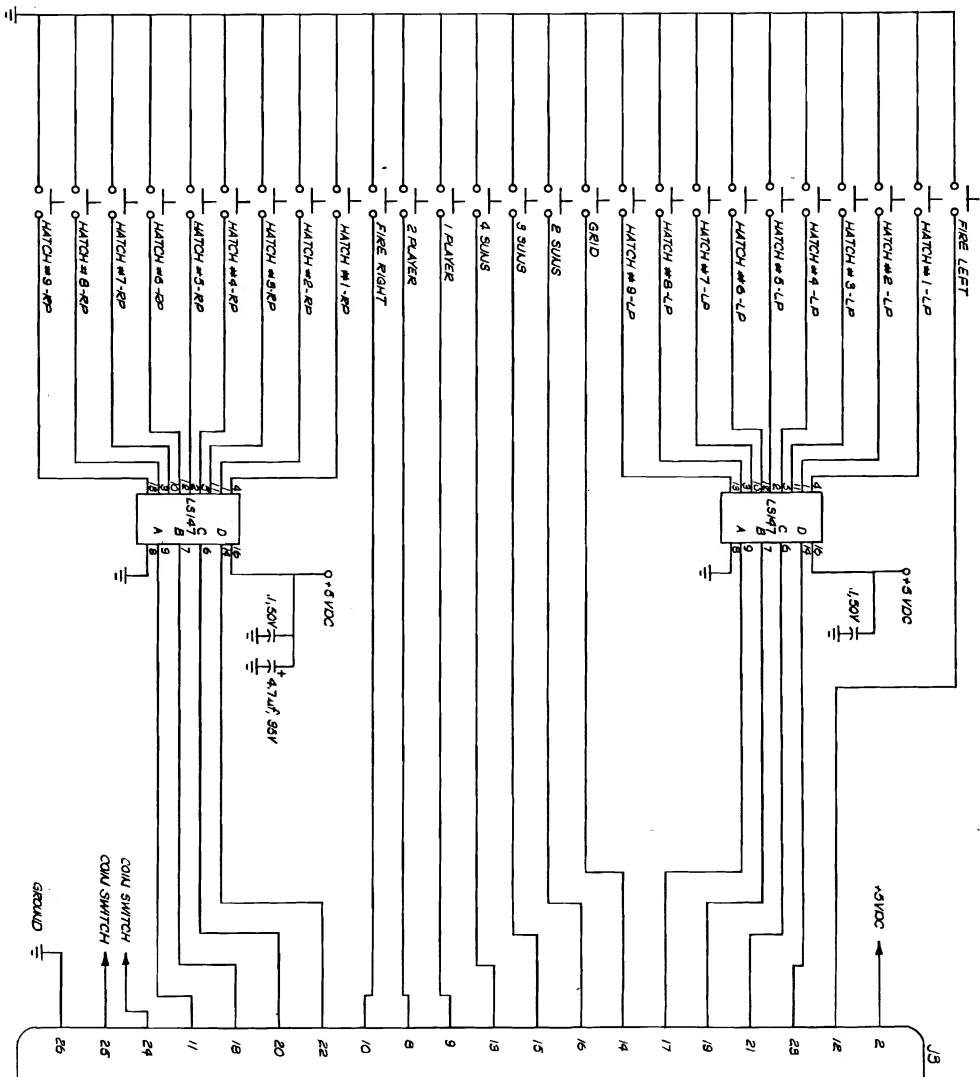
REVISIONS		
REV	DESCRIPTION	DATE
1		

MATERIAL:		DRAWN BY: S. HURLBERT		DATE: 7/73
FINISH: ALL SHARP EDGES AND DEBURR ALL HOLES.		PROJECT ENGR: C. WILLIAMS		DATE: 7/73
DO NOT SCALE DWG		RELEASE APPROV: DATE		
TOLERANCE: UNLESS OTHERWISE SPECIFIED		PROJECTION: SCALE: NONE		
DWG TITLE: SCHEMATIC		CINEMATRONICS INC.		El Cajon, Ca. 92020
16 LEVEL INTENSITY		MODEL NO. SD203201-2		REV. XI
CODE IDENT.		SHEET 1 OF 1		

1

I

MATERIAL:		5" DRUM, 8" BERT		7-25		Ei Cajon Ca. 92202	
FINISH:		ALL SHARP EDGES AND DEBURR ALL HOLES.		PROJECT ENGR: C. WILLIAMS			
		RELEASE APPROV		DATE			
		DO NOT SCALE DWG					
		TOLERANCE: UNLESS OTHERWISE SPECIFIED					
PROJECTION:		SCALE:		2:1			
CODE IDENT.		SHEET		OF		1	



1. LP DELAYES LEFT PLAYER, RP DELAYES RIGHT PLAYER.
NOTES: UNLESS OTHERWISE SPECIFIED

DATE		DRAWN BY		DATE	
12/27/83		J. J. J.		12/27/83	
PROJECT ENGR.		DATE		DATE	
12/27/83		12/27/83		12/27/83	
RELEASE APPROV.		DATE		DATE	
12/27/83		12/27/83		12/27/83	
DWG TITLE		CINEMATRONICS INC.		SHEET 1 OF 1	
DO NOT SCALE DWG		COURTESY PANEL		REV	
TOLERANCE UNLESS OTHERWISE SPECIFIED		MOORE, NO. 012		50209204	
PROJECTION: SCALE		CODE IDENT.		SHEET 1 OF 1	
1:1		12/27/83		12/27/83	